ABSTRACT

Background: Chemotherapy is a well-established therapeutic modality known for ages for the treatment of breast cancer. Both adjuvant and neoadjuvant chemotherapy has significantly reduced the morbidity and mortality associated with breast cancer. However, chemotherapy is associated with an increased incidence of adverse effects attributed to the drug as well as patient characteristics.

In majority of patients, the dose which produces the therapeutic effect may also be responsible for toxic effects. Therefore, optimizing the drug dosage to reduce the exposure may have the therapeutic advantage of maximizing the efficacy of the drug while reducing the adverse effects.

Aim: To study the influence of plasma concentration of Adriamycin, Cyclophosphamide and Paclitaxel on the liver and renal functions, tumour size reduction, receptor status (ER/PR) and adverse drug effects of patients with breast cancer.

Methodology: This study was done in the Department of Pharmacology, PSG Institute of Medical Sciences and Research (PSG IMS&R), Coimbatore during the period of November 2016 to October 2017. A total of 30 patients with breast cancer on AC/T regimen (Adriamycin and Cyclophosphamide 4 cycles followed by Paclitaxel 4 cycles) were enrolled and were grouped into 3, with 10 patients for each drug under study. The data pertaining to the treatment of breast cancer such as tumour size, drug and dosage, Estrogen/Progesterone receptor (ER/PR) status, laboratory

parameters including liver and renal function test and complete blood count (CBC), nature of chemotherapy (adjuvant /neoadjuvant) and number of cycles completed were obtained from the medical records of the patient. Patients were also asked about the occurrence of adverse effects like nausea, vomiting, etc.

About two ml of venous blood was collected from the study participants at the end of infusion of the drug and centrifuged to separate plasma. The samples were then analyzed using HPLC and the plasma concentration of the drugs was determined.

Results: The mean plasma concentration of Adriamycin, Cyclophosphamide and Paclitaxel was found to be 3460.50, 1592.44 and 3038.29 ng/ml respectively. we found that the plasma concentration of the drugs showed inter-individual variations which were consistent with the previous studies. The statistical analysis was done using Pearson correlation. No significant correlation of plasma concentration of these chemotherapeutic drugs was found with the other clinical, biochemical and hormonal parameters.

Conclusion: From our study we conclude that the plasma concentration alone is not a determinant of clinical outcome or toxicities in these patients. Dose optimisation has to be validated prospectively in a large group of patients with more pharmacokinetic-pharmacodynamic parameters.

Keywords: Chemotherapy, AC/T regimen, HPLC analysis, clinical outcome.